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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KUNIYUKI KAJITA

Appeal 2007-2624
Application 09/701,433
Technology Center 2100

Decided: March 7, 2008

Before LANCE LEONARD BARRY, ALLEN R. MACDONALD, and JEAN R. HOMERE, *Administrative Patent Judges*.

BARRY, *Administrative Patent Judge*.

DECISION ON APPEAL

I. STATEMENT OF THE CASE

A Patent Examiner rejected claims 11-13, 19-25, and 31-44. The Appellant appeals therefrom under 35 U.S.C. § 134(a). We have jurisdiction under 35 U.S.C. § 6(b).

A. Invention

1The invention at issue on appeal provides "a radio communication apparatus with a coding processing method" to combat burst error in a propagation path. (Substitute App. Br.[1] 3.) The Appellant observed that "the prior art technique" described in pages 1-5 of his Specification and shown in the associated Figs. 1A, 1B, and 2[2] suffers burst errors because of increased bits being partial to a portion within a frame. He recognized that the problem occurs as a result of the timing of the repetition and interleaving processing in the prior art technique, where repetition processing of all of the data is performed prior to interleaving. In contrast, the Appellant's invention alters this timing so that there is repetition after interleaving, which he asserts yields a well-balanced condition of increased bits from the repetition within the frame. (*Id.* 4.)

B. Illustrative Claims

Claims 19, 31, and 32, which further illustrate the invention, follow.

19. A radio transmission method comprising:

[1] We rely on and refer to the Substitute Appeal Brief, in lieu of the original Appeal Brief, because the latter was defective. We will not consider the original in deciding this appeal.

[2] Figures showing the prior art shall "be designated by a legend such as 'Prior Art.'" MPEP § 608.02(g). Here, the Appellant admits that his Figures 1A, 1B, and 2 show a "prior art technique . . . ." (Br. 4.) Therefore, the Figures require the aforementioned legend.

(a) performing error correction coding of input data including a plurality of bits;

(b) performing interleaving of said bits coded in step (a) ;

(c) employing a rate matcher that comprises a repeater and a puncturer to alternatively select between (i) using said repeater to repeat a part of bits interleaved in step (b) and (ii) using said puncturer to puncture a part of the bits interleaved in step (b) ; and

(d) transmitting data including bits provided by said rate matcher in step (c).

31. A radio transmission method comprising:

(a) performing error correction coding of input data including a plurality of bits;

(b) performing interleaving of said bits coded in step (a) ;

(c) employing a rate matcher that repeats a part of bits interleaved in step (b) ; and

(d) transmitting data including bits provided by said rate matcher in step (c).

32. A radio reception method comprising:

(a) receiving data including a plurality of bits transmitted by the radio transmission method of claim 31;

(b) employing a second rate matcher that punctures bits repeated by said rate matcher employed in said radio transmission method; and

(c) performing deinterleaving of data including bits provided by said second rate matcher in step (b), in accordance

with the interleaving performed in said radio transmission apparatus.

C. REJECTIONS

Claims 11-13, 19, 21-25, 31, 33, 34, 36, 38, 41, and 43 stand rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 6,199,186 ("Chen"); *Study on Wideband CDMA System in Burst Error Environment* ("Akihiko"); and *Rate Matching in Multi-Channel Systems using RCPC-Codes* ("Frenger"); and (Rev. Ans.[3] 3-4.) Claims 20, 32, 35, 37, 39, 40, 42, and 44 stand rejected under § 103(a) as obvious over Chen, Akihiko, Frenger, and the Appellant's admitted prior art ("AAPA").

II. CLAIM GROUPING

1"When multiple claims subject to the same ground of rejection are argued as a group by appellant, the Board may select a single claim from the group of claims that are argued together to decide the appeal with respect to the group of claims as to the ground of rejection on the basis of the selected claim alone. Notwithstanding any other provision of this paragraph, the failure of appellant to separately argue claims which appellant has grouped

[3] We rely on and refer to the Revised Examiner's Answer in lieu of the original Examiner's Answer. We will not consider the original in deciding this appeal.

together shall constitute a waiver of any argument that the Board must consider the patentability of any grouped claim separately." 37 C.F.R. § 41.37(c)(1)(vii) (2006).[4]

Here, the Appellant stipulates, "[I]ndependent claims 11 and 19 and dependent claims 12, 13, 21, 22, 36, and 38 stand or fall together." (Substitute App. Br. 11.) He further stipulates, "Independent claims 23 and 31 and dependent claims 24, 25, 33, 34, 41 and 43 stand or fall together." (*Id.*) We select claims 19 and 31 as the sole claims on which to decide the appeal of the respective groups.

The Appellant argues claims 20, 32, 35, 37, 39, 40, 42, and 44 as a group of "reception claims . . . ." (Reply Br. 19.) We select claim 32 as the sole claim on which to decide the appeal of the latter group. "With this representation in mind, rather than reiterate the positions of the parties *in toto*, we focus on the issues therebetween." *Ex Parte Zettel*, No. 2007-1361, 2007 WL 3114962, at *2 (BPAI 2007).

III. BIT REPETITION AFTER BIT INTERLEAVING

The Examiner concludes, "[I]t would have been obvious . . . to incorporate a rate matcher that is performed after interleaving as taught by

[4] We cite to the version of the Code of Federal Regulations in effect at the time of the Appeal Brief. The current version includes the same rules.

Akihiko et al into the invention of Chen et al and Frenger et al to rate match for reducing burst errors." (Rev. Ans. 11.) The Appellant argues, "Reducing burst error cannot be a motivation to combine these references. The rate-matching is used for adapting the data rate not for reducing burst error." (Reply Br. 11.) He further argues, "If a person skilled in the art intends to reduce the burst error, the interleaving would be performed after rate-matching as taught by Akihiko Watanabe [sic] et al." (*Id.*) Therefore, the issue is whether teachings from the prior art would have suggested transmitting data by performing bit repetition after bit interleaving.

"Both anticipation under § 102 and obviousness under § 103 are two-step inquiries. The first step in both analyses is a proper construction of the claims . . . . The second step in the analyses requires a comparison of the properly construed claim to the prior art." *Medichem, S.A. v. Rolabo, S.L.*, 353 F.3d 928, 933, (Fed.Cir. 2003) (internal citations omitted).

A. Claim Construction

"[T]he PTO gives claims their 'broadest reasonable interpretation.'" *In re Bigio*, 381 F.3d 1320, 1324 (Fed. Cir. 2004) (quoting *In re Hyatt*, 211 F.3d 1367, 1372 (Fed. Cir. 2000)). "Moreover, limitations are not to be read into the claims from the specification." *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993) (citing *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989)).

Here, claim 19 recites in pertinent part the following limitations: "using said repeater to repeat a part of bits interleaved . . . ." 1Similarly, claim 31 recites in pertinent part the following limitations: " employing a rate matcher that repeats a part of bits interleaved . . . ." Giving the representative claims the broadest, reasonable construction, the limitations require transmitting data by performing bit repetition after bit interleaving.

B1. Obviousness Analysis

> Although common sense directs one to look with care at a patent application that claims as innovation the combination of . . . known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.

KSR Int'l v. Teleflex Inc., 127 S.Ct. 1727, 1741 (2007). The presence or absence of such a reason "to combine references in an obviousness determination is a pure question of fact." *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000) (citing *In re Dembiczak*, 175 F.3d 994, 1000 (Fed. Cir. 1999)). A reason to combine teachings from the prior art "may be found in explicit or implicit teachings within the references themselves, from the ordinary knowledge of those skilled in the art, or from the nature of the problem to be solved." *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1357 (Fed. Cir. 1999) (citing *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998)).

Here, Chen "relates to the screening for errors in data transmission systems." (Col. 1, ll. 8-9.) The reference's "FIG. 1 shows a block diagram of a digital communication system [100]." (Col. 4, l. 6.) The "[s]ystem 100 includes transmitter 110, communications channel 120, and receiver 130." (*Id.* ll. 8-9.) Chen describes the transmitter as follows

> Transmitter 110 includes an audio coder 112 which generates frames . . . of digital data bits from a received analog audio signal. Block encoder, shown here illustratively as Cyclic Redundancy Check ("CRC") encoder 113, appends CRC bits to a selected number of frames or portions of one or more frames thereby generating CRC frames, or blocks. CRC blocks are applied to convolutional encoder 114 to encode CRC blocks into a sequence of symbols. The symbols from convolutional encoder 114 are interleaved in an interleaver 115 of conventional design and then applied to modulator 116. Modulator 116 generates a channel signal for transmission over communications channel 120 using standard modulation techniques.

(*Id.* ll. 9-22.)

For its part, Akihiko "shows three methods for reduction of burst errors" (§ II, ¶ 2), viz., "(a) the method by repetition and interleaver (Rep-Int method), (b) the method by interleaver and repetition (Int-Rep method), and (c) the method by interleaver and DTX (Int-DTX method)" (*id.*). "In the Int-REP method (b), interleaving followed by repetition is performed after convolutional coding." (*Id.* ¶ 3.)

In summary, Chen is concerned with errors in data transmission and performs interleaving after convolution encoding, and Akhiko discloses that following convolution encoding with bit interleaving followed by bit interleaving reduces burst errors. We agree with the Examiner that these teachings would have prompted a person of ordinary skill in the relevant field to transmit data by performing bit repetition after bit interleaving.

The premise of the Appellant's argument that "[r]educing burst error cannot be a *motivation* to combine these references" (Reply Br. 11 (emphasis added)), seems to be that a motivation is required to combine teachings of references. "The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents. The diversity of inventive pursuits and of modern technology counsels against limiting the analysis in this way." *KSR*, 127 S.Ct. at 1741. Furthermore, Akhiko belies the argument that "rate-matching is used for adapting the data rate not for reducing burst error" (Reply Br. 11), by "discuss[ing] the use of interleaving and repetition techniques *in combination* to reduce the number of burst errors." (Abstract.)

The premise of the Appellant's other argument that "[i]f a person skilled in the art intends to reduce the burst error, the interleaving would be performed after rate-matching" (Reply Br. 11), seems to be that only the best

embodiment taught by a reference is available as prior art. "But in a section 103 inquiry, 'the fact that a specific [embodiment] is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered.'" *Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807 (Fed.Cir.1989) (quoting *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976)). Here, Akhiko's Int-Rep method, which performs bit repetition after bit interleaving, must be considered. Furthermore, the reference teaches that the Int-Rep method and the Rep-Int method perform equally well in many situations. More specifically, "[i]n the slow-speed fading region where the maximum doppler frequency is 50 Hz, no appreciable difference is seen among these methods" (§ IV), and "[w]hen effective paths are more than three, no appreciable difference is seen among these methods" (*id.*). Therefore, we affirm the rejection of claim 23 and of claims 24, 25, 31, 33, 34, 41, and 43, which fall therewith. We have another issue, however, to address regarding claims 11-13, 19, 21, 22, 36, and 38.

IV. REPEATING AND PUNCTURING BITS

The Examiner finds, "Frenger et al disclose a rate matcher that comprises a repeater and a puncture (col. 2, section II, RCPC-Codes for Rate Matching, pg. 354)." (Rev. Ans. 4.) The Appellant argues, "Frenger does not disclose a single device employing both RCPC-codes (puncturing) and a fixed convolutional code concatenated with a repetition code (repeating)." (Substitute App. Br. 14.)

A. Claim Construction

Claim 19 further recites in pertinent part the following limitations: "employing a rate matcher that comprises a repeater and a puncturer to alternatively select between (i) using said repeater to repeat a part of bits interleaved . . . and (ii) using said puncturer to puncture a part of the bits interleaved . . . ." Giving the representative claim the broadest, reasonable construction, the limitations require performing rate matching by alternatively repeating bits and puncturing bits.

B1. Obviousness Analysis

The question of obviousness is "based on underlying factual determinations including . . . what th[e] prior art teaches explicitly and inherently . . . ." *In re Zurko*, 258 F.3d 1379, 1383 (Fed. Cir. 2001) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966); *Dembiczak*, 175 F.3d at 998; *In re Napier*, 55 F.3d 610, 613 (Fed. Cir. 1995)). "[W]hen a patent 'simply arranges old elements with each performing the same function it had been known to perform' and yields no more than one would expect from such an arrangement, the combination is obvious." *KSR*, 127 S.Ct. at 1739 (2007) (quoting *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273, 282 (1976)).

Here, the Appellant admits, "In mobile radio communication, particularly in CDMA [i.e., Code-Division Multiple Access] radio communication, [r]ate matching processing is performed in order to enhance an effect of error correction, and/or in order to transmit data such as a

packet, ISDN [i.e., Integrated Services Digital Network] and so forth while coupling the data." (Spec. 1.) He characterizes performing rate matching by repeating bits and by puncturing bits a "prior art technique . . . " (Substitute App. Br. 4.) According to the prior art technique, the Appellant admits, "The [r]ate matching processing is repetition processing for increasing the number of bits of data in order to adjust coded data to frame length, or puncturing processing for reducing the number of bits of data in order to adjust coded data to frame length." (Spec. 1.)

As found regarding the first issue, Akihiko discloses the Int-Rep method wherein "interleaving followed by repetition is performed after convolutional coding." (§ II, ¶ 3.) The Appellant admits that the reference's repetition of bits constitutes "rate-matching . . . used for adapting the data rate . . . ." (Reply Br. 11.)

For its part, Frenger performs rate matching by puncturing bits. More specifically, "[r]ate-compatible punctured convolutional codes (RCPC-codes) are proposed for rate matching . . . ." (Abs. ll. 1-2.) The reference explains that such puncturing offers the following advantages.

> RCPC-codes can provide the large number of different channel coding rates needed for future mobile communication services. An important feature of RCPC-codes is that the same decoder can be used for all different code rates, which reduces the receiver complexity. Whenever multiple data rates are provided by assigning multiple slots, carriers or codes to one

> user, we will have large steps in the possible channel data rates provided by the system. RCPC-codes can fill this gap and provide a flexible and efficient method for source data rate matching.

(§ I, ¶ 2.)[5]

In summary, Akihiko teaches performing rate matching by repeating bits, and Frenger teaches performing rate matching by puncturing bits. The Appellant admits that rate matching used to adjust coded data to a frame length comprises repeating to increase the number of bits of data or puncturing to reduce the number of bits. We find that one of ordinary skill in the art could have used known methods to combine the aforementioned teachings to perform rate matching by alternatively repeating bits and puncturing bits. We further find that each element in the combination would have performed the same function as it did separately, and that the one of ordinary skill in the art would have recognized that the results of the combination were predictable. Therefore, we affirm the rejection of claim 19 and of claims 11-13, 21, 22, 36, and 38, which fall therewith.

V. BIT PUNCTURING BEFORE BIT DEINTERLEAVING

[5] Frenger also discloses performing rate matching by repeating bits. More specifically, "[a]n alternative way to perform rate matching is to have a higher rate convolutional encoder concatenated with a repetition encoder that simply repeats, some of the bits for transmission." (§ II, ¶ 2.) The reference explains that "[f]or a given constraint length of the convolutional mother code these two approaches have equal computational complexity." (*Id.*)

> The Examiner makes the following assertion.
>
> > [I]t would have been obvious . . . in the receiver side, to reconstruct the interleaving data by de-interleaving it before or after a second rate matching by repetition or puncture, according to the order of the transmitter side, for adjusting the number of bits in the data block to reverse the action of the coding device.

(Rev. Ans. 8.) The Appellant argues, "[T]his statement provides no reason for selecting a timing for the rate matching, i.e., either before or after deinterleaving." (Reply Br. 19.) Therefore, the issue is whether teachings from the prior art would have suggested receiving data by performing bit puncturing before bit deinterleaving.

A. Claim Construction

Claim 32 recites in pertinent part the following limitations: "performing deinterleaving of data including bits provided by said second rate matcher . . . ." Giving the representative claim the broadest, reasonable construction, the limitations require receiving data by performing bit puncturing before bit deinterleaving.

B1. Obviousness Analysis

"A person of ordinary skill is also a person of ordinary creativity, not an automaton." *KSR*, 127 S.Ct. at 1742. Consequently, "a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.* at 1741.

Here, because the Appellant admits that his Figures 1A and 1B show a "prior art technique" (Substitute App. Br. 4), these Figures constitute AAPA. More specifically, "FIG. 1A is a block diagram illustrating a configuration of a conventional coding processing apparatus; FIG. 1B is a block diagram illustrating a configuration of a conventional decoding processing apparatus . . . ." (Spec. 6.) A person of ordinary skill would have understood that collectively these Figures teach that data have to be decoded in the reverse order in which these were encoded. Such a person would have understood the same from comparing the order of the components of Chen's transmitter 110 (Fig. 1) with those of its receiver 130 (*id.*).

As explained regarding the first issue, teachings from the prior art would have suggested transmitting data by performing bit repetition after bit interleaving. Because data have to be decoded in the reverse order in which these were encoded, the combined teachings of the reference would have suggested receiving data by performing bit puncturing before bit deinterleaving. Therefore, we affirm the rejection of claim 32 and of claims 20, 35, 37, 39, 40, 42, and 44, which fall therewith.

VI. ORDER

In summary, the rejections of claims 11-13, 19-25, and 31-44 under § 103(a) are affirmed.

"Any arguments or authorities not included in the brief or a reply brief filed pursuant to [37 C.F.R.] § 41.41 will be refused consideration by the Board, unless good cause is shown." 37 C.F.R. § 41.37(c)(1)(vii). Accordingly, our affirmance is based only on the arguments made in the briefs. Any arguments or authorities omitted therefrom are neither before us nor at issue but are considered waived. *Cf. In re Watts*, 354 F.3d 1362, 1367 (Fed. Cir. 2004) ("[I]t is important that the applicant challenging a decision not be permitted to raise arguments on appeal that were not presented to the Board.")

No time for taking any action connected with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

rwk

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